

supplied. The gripping surface (handle) shall be colored red and shall be easily distinguishable from the rest of the operator. It shall be capable of being adjusted to a height of 6 feet (1.8 m) above the garage floor when the operator is installed according to the instructions specified in § 1211.14(a)(2). The means shall be constructed so that a hand firmly gripping it and applying a maximum of 50 pounds (223 N) of force shall detach the operator with the door obstructed in the down position. The obstructing object, as described in § 1211.7(b), is to be located in several different positions. A marking with instructions for detaching the operator shall be provided as required by § 1211.15(i).

(b) A means to manually detach the door operator from the door is not required for a door operator that is not directly attached to the door and that controls movement of the door so that:

(1) The door is capable of being moved open from any position other than the last (closing) 2 inches (50.8 mm) of travel, and

(2) The door is capable of being moved to the 2-inch point from any position between closed and the 2-inch point.

(c) Actuation of a control that initiates movement of a door shall stop and may reverse the door on the down cycle. On the up cycle, actuation of a control shall stop the door but not reverse it.

(d) An operator shall be constructed so that adjustment of limit, force or other user controls and connection of external entrapment protection devices can be accomplished without exposing normally enclosed live parts or wiring.

[57 FR 60455, Dec. 21, 1992, as amended at 65 FR 70658, Nov. 27, 2000]

§ 1211.10 Requirements for all entrapment protection devices.

(a) *General requirements.* (1) An external entrapment protection device shall perform its intended function when tested in accordance with paragraphs (a) (2) through (4) of this section.

(2) The device is to be installed in the intended manner and its terminals connected to circuits of the door operator as indicated by the installation instructions.

(3) The device is to be installed and tested at minimum and maximum heights and widths representative of recommended ranges specified in the installation instructions. For doors, if not specified, devices are to be tested on a minimum 7 foot (2.1 m) wide door and maximum 20 foot (6.1 m) wide door.

(4) If powered by a separate source of power, the power-input supply terminals are to be connected to supply circuits of rated voltage and frequency.

(5) An external entrapment protection device requiring alignment, such as a photoelectric sensor, shall be provided with a means, such as a visual indicator, to show proper alignment and operation of the device.

(b) *Current protection test.* (1) There shall be no damage to the entrapment protection circuitry if low voltage field-wiring terminals or leads are shortened or miswired to adjacent terminals.

(2) To determine compliance with paragraph (b)(1) of this section, an external entrapment protection device is to be connected to a door operator or other source of power in the intended manner, after which all connections to low voltage terminals or leads are to be reversed as pairs, reversed individually, or connected to any low voltage lead or adjacent terminal.

(c) *Splash test.* (1) An external entrapment protection device intended to be installed inside a garage 3 feet or less above the floor shall withstand a water exposure as described in paragraph (c)(2) of this section without resulting in a risk of electric shock and shall function as intended. After exposure, the external surface of the device may be dried before determining its functionality.

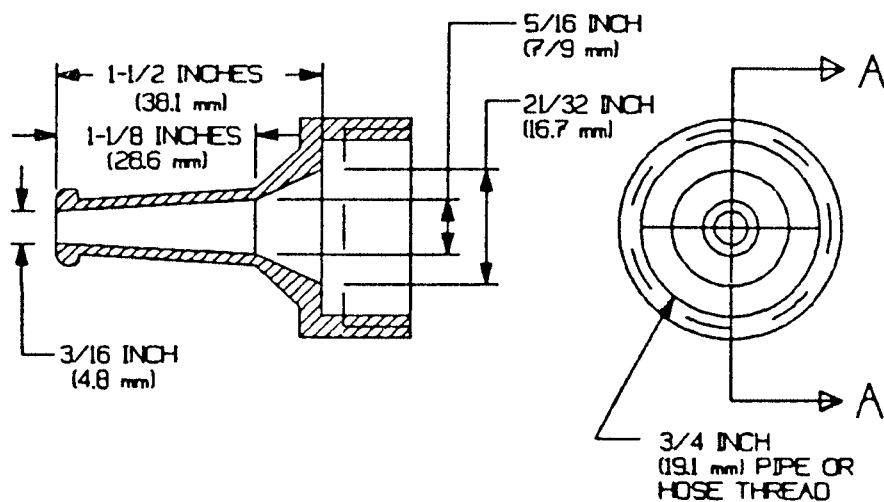
(2) External entrapment protection devices are to be indirectly sprayed using a hose having the free end fitted with a nozzle as illustrated in figure 2 and connected to a water supply capable of maintaining a flow rate of 5 gallons (19 liters) per minute as measured at the outlet orifice of the nozzle. The water from the hose is to be played, from all sides and at any angle against the floor under the device in such a manner most likely to cause water to splash the enclosure of electric components. However, the nozzle is not to be

brought closer than 10 feet (3.05 m) horizontally to the device. The water is to be sprayed for 1 minute.

Figure 2

NOZZLE

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(d) *Ultraviolet light exposure test.* A polymeric material used as a functional part of a device that is exposed to outdoor weather conditions shall comply with the Ultraviolet Light Exposure Test described in the Standard for Safety for Polymeric Materials—Use in Electrical Equipment Evaluations, UL 746C, 4th ed., dated December 27, 1995. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112, Telephone (800) 854-7179 or Global Engineering Documents, 7730 Carondelet Ave., Suite 470, Clayton, MO 63105, Telephone

(800) 854-7179. Copies may be inspected at the Consumer Product Safety Commission, Office of the Secretary, 4330 East West Highway, Bethesda, Maryland or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, D.C.

(e) *Resistance to impact test.* (1) An external entrapment protection device employing a polymeric or elastomeric material as a functional part shall be subjected to the impact test specified in paragraph (e)(2) of this section. As a result of the test:

(i) There shall be no cracking or breaking of the part, and

(ii) The part shall operate as intended or, if dislodged after the test, is capable of being restored to its original condition.

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(2) Samples of the external entrapment protection device are to be subjected to the Impact Test described in the Standard for Polymeric Materials—Use in Electrical Equipment Evaluations, UL 746C, 4th ed., dated December 27, 1995, as incorporated by reference in paragraph (d) of this section. The external entrapment protection device is to be subjected to 5 foot-pound (6.8 J) impacts. Three samples are to be tested, each sample being subjected to three impacts at different points.

(3) Each of three additional samples of a device exposed to outdoor weather when the door is the closed position are to be cooled to a temperature of minus 31.0 ± 3.6 °F (minus 35.0 ± 2.0 °C) and maintained at this temperature for 3 hours. Three samples of a device employed inside the garage are to be cooled to a temperature of 32.0 °F (0.0 °C) and maintained at this temperature for 3 hours. While the sample is still cold, the samples are to be subjected to the

impact test described in paragraph (e)(1) of this section.

[57 FR 60455, Dec. 21, 1992, as amended at 62 FR 46667, Sept. 4, 1997; 65 FR 70659, Nov. 27, 2000]

§ 1211.11 Requirements for photoelectric sensors.

(a) *Normal operation test.* (1) When installed as described in § 1211.10(a) (1)–(4), a photoelectric sensor shall sense an obstruction as described in paragraph (a)(2) of this section that is to be placed on the floor at three points over the width of the door opening, at distances of 1 foot (305 mm) from each end and the midpoint.

(2) The obstruction noted in paragraph (a)(1) of this section shall consist of a white vertical surface 6 inches (152 mm) high by 12 inches (305 mm) long. The obstruction is to be centered under the door perpendicular to the plane of the door when in the closed position. See figure 3.